Factor XIII, A1 Subunit

Alternative Names
F13A1
F13A
Fibrin Stabilizing Factor, A Subunit
FSF, A Subunit
Fibrinoligase
Transglutaminase, Plasma

Record Category
Gene locus

WHO-ICD
N.B.: Classification not applicable to gene loci.

Incidence per 100,000 Live Births
N/A to gene loci

OMIM Number
134570

Mode of Inheritance
Autosomal recessive

Gene Map Locus
6p25.1

Description
Coagulation factor XIII is the last enzyme produced in the blood coagulation cascade. The plasma form of this protein is a hetero-tetramer consisting of two A and two B subunits. Intracellular FXIII, meanwhile, is a homodimer comprising of two A subunits only. Catalytic function is carried out only by the A subunits, and involves acting as a transglutaminase to cross-link fibrin molecules via a gamma-glutamyl-epsilon-lysine link, thereby stabilizing the fibrin clot. Additionally, FXIII also cross-links several other protein substrates in the plasma and subendothelium, including fibronectin, von Willebrand factor, vitronectin, collagen, coagulation factor V, thrombospondin and plasminogen activator inhibitor type 1.

Congenital factor XIII (FXIII) deficiency is a rare autosomal recessive disorder, characterized by frequent hemorrhagic diathesis correlated with spontaneous abortions, and defective wound healing, and results from reduced levels and activity of FXIII.

Molecular Genetics
The F13A1 gene is located on chromosome 6p24-25, and comprises 15 exons encoding a 732 amino acid protein. The FXIIIA protein is composed of five distinct domains: an activation peptide, a beta-sandwich, a central core, beta-barrel 1, and beta-barrel 2 regions. The central core domain contains a catalytic triad comprising Cys314, His373 and Asp396 that interact with each other through a hydrogen bonding network.

There are more than 60 mutations reported for FXIII-A, with the vast majority being missense or nonsense mutations. These mutations are spread throughout the gene, but are concentrated between exons 3 and 14. Studies in various diverse populations have suggested that the Val34Leu polymorphism confers protection against venous thromboembolism as well as acute myocardial infarction, although recent studies seem to contradict this claim. Two other polymorphisms, Tyr204Phe and Pro564-Leu, have been linked with increased risk of hemorrhagic stroke in young women.

Epidemiology in the Arab World
Jordan
Gharaibeh et al. (2014) studied 50 consecutive patients with retinitis pigmentosa and 50 controls matched by age and gender to determine the prevalence of thrombophilic factors. Among patients/controls they found the p.Val34Leu heterozygous mutation in the factor XIIIa gene (20/30). Gharaibeh et al. (2014) concluded that the difference between patients with retinitis pigmentosa...
and the control group was not statistically significant for the prevalence of this studied factor.

**Syria**

A homozygous c.779G>A transition in exon 6 of the F13A1 gene, resulting in a p.R260H substitution within the core domain of the factor XIII A subunit, was detected by Kangsadalampai et al. (1999) in a child of Syrian descent suffering from factor XIII deficiency. Functional expression studies in yeast showed that the mutation resulted in dramatically reduced catalytic activity and level of enzyme expression. It is worth mentioning that the grandparents of the propositus are first cousins, which implies that the case has a degree of consanguinity in the family.

**References**


**Related CTGA Records**

Factor XIII A Subunit Deficiency of

**External Links**

http://www.hemophilia.org/NHFWeb/MainPgs/MainNHF.aspx?menusid=71&contentid=58

**Contributors**

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